IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

Shiyan Hua and Yigang Cai

CASE Cai 15-11

TITLE: Intelligent-Networked System With Service For Notifying And Hearing Selected E-Mails Via A Public Switched Telephone Network

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Enclosed are the following papers relating to the above-named application for patent:

Specification
3 Formal sheets of drawing(s)
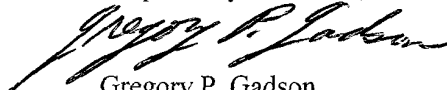1 Assignment with Cover Sheet
Declaration and Power of Attorney
Postcard

CLAIMS AS FILED				
	NO. FILED	NO. EXTRA	RATE	CALCULATIONS
Total Claims	27-20 =	7	x $18 =	$126
Independent Claims	2-3 =	0	x $78 =	$0
Multiple Dependent Claims	0	---	x $260 =	$0
Basic Fee				$690
			TOTAL FEE:	$816

Please file the application and charge **Lucent Technologies Deposit Account No. 12-2325** the amount of $816, to cover the filing fee. Duplicate copies of this letter are enclosed. In the event of non-payment or improper payment of a required fee, the Commissioner is authorized to charge or credit **Deposit Account No. 12-2325** as required to correct the error.

Please address all correspondence to Gregory P. Gadson, Esq., 19375 Amber Way, Indianapolis, IN 46060. Telephone calls should be made to me at (317) 773-9083.

Respectfully submitted,

Gregory P. Gadson
Reg. No. 31,254
Attorney for Applicant(s)

Date: 2/29/2000

Lucent Technologies Inc.
600 Mountain Avenue
P.O. Box 636
Murray Hill, New Jersey 07974-0636

2000-085trans.doc

INTELLIGENT-NETWORKED SYSTEM WITH SERVICE FOR NOTIFYING AND HEARING SELECTED E-MAILS VIA A PUBLIC SWITCHED TELEPHONE NETWORK

BACKGROUND OF THE INVENTION

1.   Field of the Invention

The present invention generally relates to networks for providing telephone calls, and networks for providing Electronic Mail messages.

2.   Background

As is well known in the art, Electronic Mail ("E-Mail") consists of computer generated messages and files by a sending party, which are intended to be electronically transmitted and read by a receiving party.

It is desirable to allow telephone customers to have access to e-mail messages in audio form while they are away from computers. The prior art has attempted to fill this need by providing such systems as the Octel™ Unified Messenger System belonging to Lucent Technologies, Inc. Among the noticeable limitations of that system and others is the fact that e-mail messages are only available through a paging system when a computer is not available to receive the e-mail message. Additionally, these systems require the use of Private Branch Exchange (PBX) systems tied into a server having special software compatible with the particular audio e-mail system. As a

result of the special hardware and software requirements, prior art audio e-mail systems are not available for general Public Switched Telephone Network (PSTN) customers.

To that end, it is desirable to provide an audio e-mail system for converting text messages to audio messages, which system is potentially available to the masses of PSTN customers who have e-mail accounts. And, this system should not require the customer to install any special hardware or software.

SUMMARY OF THE INVENTION

In view of the aforementioned problems and deficiencies of the prior art, the present invention provides in a telecommunication system, a method of providing to a subscriber, an audio message converted from an electronic text message. The several steps of the method include providing a plurality of telephonic devices for initiating and receiving telephone calls, and providing an automated intelligent network (IN) for the automated processing of telephone calls in the telecommunication system. The IN at least includes a service control point (SCP) at least including control logic and an SCP database, and the IN at least includes a plurality of switches coupled to telephone devices.

The method further includes the steps of, via the switches, routing calls authorized by the SCP to a destination number specified by a calling party, via the IN and the SCP, receiving an electronic mail (e-mail) message specifying a subscriber as the intended recipient of the e-mail message, and terminating a telephone call generated by the IN to a telephone number specified by the subscriber in the SCP database.

The method also includes the steps of converting text in the e-mail message to an audio message, and transmitting during the telephone call, an outgoing message at least including the audio message.

The present invention also provides a telecommunication system adapted to provide to a subscriber, an audio message converted from an electronic text message. The system has several elements, including a plurality of telephonic devices adapted to initiate and receive telephone calls, and an IN adapted to automatically process telephone calls in the telecommunication system, the IN at least including an SCP having control logic and an SCP database, and the IN at least including a plurality of switches coupled to telephone devices. The system also at least includes a text-to-audio converter adapted to convert text in an e-mail message to an audio message.

The switches are adapted to route calls authorized by the SCP to a destination number specified by a calling party, while the IN and SCP are

adapted to receive an e-mail message specifying a subscriber as the intended

recipient of the e-mail message. The IN is also adapted to generate and ter-

minate a telephone call to a telephone number specified by the subscriber in

the SCP database, and to cause to be transmitted during the telephone call,

5   an outgoing message at least including the audio message.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

Features and advantages of the present invention will become appar-

ent to those skilled in the art from the description below, with reference to

10   the following drawing figures, in which:

Figure 1 is a schematic block diagram of the basic hardware for the

intelligent-networked telecommunication system for implementing the pres-

ent-inventive service for Notifying and Hearing Selected E-mails (NHSE);

Figure 2 is a schematic block diagram the Service Control Point

15   (SCP) of the Intelligent Network (IN) of the present-inventive telecommuni-

cation system; and

Figure 3 is a flowchart/algorithm detailing the handling of an e-mail

message by the present-inventive telecommunication system.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

1.   NHSE Basic Hardware and Operation

The basic hardware of the telephone service system 100/180 capable

of implementing Notifying and Hearing Selected E-Mails (NHSE) service is

5   illustrated in Figure 1. The present invention is compatible with PSTNs, and

requires no additional hardware or software for telephone customers sub-

scribing to the service.

Used in this specification, the terms "termination" and "terminating"

refer to connecting a call to a destination number.

10   The system 100/180 combines a domestic network 100, as in the

United States, for example, and a foreign network 180, as in Europe, for ex-

ample. The system 100/180 includes a variety of telephonic devices as

would be common in a general telephone system. For example, a user can

connect to the network 100 using such devices as common telephones 102,

15   130 and 186. Also, a user can attempt to complete a telephone call using a

telephone that is part of a private branch exchange (PBX) 126 as is known in

the art. The telephones typically include alphanumeric keypads for inputting

Dual-Tone-Multi-Frequency (DTMF) signals, or the like, as is common.

The telephone lines in the system 100/180 are initially connected to

20   Local Exchange Centers (LECs), 104, 128, etc., as is also known in the art.

The system 100/180 includes intelligent networks 110 and 182. Intelligent Networks (INs) are software and hardware hybrids that are used to automatically process telephone calls in a telephone system. A service control point (SCP) 118 in the IN provides the logic that governs call handling, etc., and contains a database that stores useful information needed for various transactions. The IN also contains several switches (e.g., 112, 124 and 184) for both receiving calls to the network and physically routing calls to destination numbers. Each switch contains a Service Switching Point (SSP) such as the one 116 for interfacing with calling parties and performing the actual call routing under the instruction of the SCP.

The SCP and SSP may be connected with a high-speed link utilizing, for example, the Intelligent Network Application Protocol (INAP), as approved by the European Telecommunications Standards Institute (ETSI) or International Telecommunication Unit (ITU). It will be appreciated by those skilled in the art that the SCP 118 can be implemented as a networked database, not limited to one geographic location.

A Service Management System (SMS) 120 is used by customers to establish parameters for various services available (such as the NHSE service of the present invention), security codes, and any restrictions on the use of a telephone line or account.

An Originating Call Processor (OCP) such as the one 115 is part of each switch, and transfers a received call to the switch's SSP. A Terminating Call Processor (TCP) such as the one 114 is also part of each switch, and handles the termination of call processing to connect it to the destination number. The interface between the SSP 116 and the OCP 115, and the interface between the SSP and TCP use a switch internal message flow, or a common channel signaling link or any type of protocol, as will be appreciated by those skilled in the art.

As is common in present-day telephone systems, a voice mailbox 106 allows the calling party of unanswered terminated calls to leave a voice mail message for the called party.

The switches (112, 124, 184, etc.) also have associated Intelligent Peripherals (IPs) for the purpose of playing announcement messages and prompting and collecting user information. The IPs can be stand-alone units (125), or units integrated (123) within the associated switch, or a unit within the Service Node (SN) (not shown in Figure 1). In the preferred embodiment, the functions of the IPs include converting the text of e-mail messages to audio messages, and played back to the intended subscribing customer.

As can be seen from Figures 1 and 2, the SCP 118 is connected to a wide area network such as the Internet 210 to monitor e-mail transmissions

for those e-mail messages intended for customers subscribing to the present-inventive NHSE service. The SCP 118 connects to the Internet 210 by way of an e-mail server 204. An SCP database 206 stores information for the operation of the SCP and various services, including NHSE. The SCP database also contains custom data entered by subscribing customers reflecting the customers' choices for handling e-mail messages received by the system 100/180. A service processor or SCP Control Unit 206 controls the operation of the SCP and various services including the present-inventive NHSE service.

When a customer subscribes to the present-inventive NHSE service, he/she may establish service by following instructions after dialing a predetermined telephone number; or by sending a registration e-mail to the SCP or the SMS e-mail server, or registration through a service web site on the Internet. The customer can choose from among various menu items after receiving prompts. A subscribing customer establishes an NHSE list to be stored in the SCP database. In the preferred embodiment, the subscriber's NHSE list includes his/her e-mail address, the telephone number where e-mail messages are to be forwarded, e-mail truncation information indicating whether the subscriber desires that e-mail messages transmitted shall be truncated, and the truncation length, and other selective information.

The selective information includes various items such as a list of senders' e-mail addresses for messages from those senders that the subscriber would like to have converted and transmitted by the NHSE service, if desired, keywords in the sender's e-mail address that will activate the service, keywords in a received e-mail's subject or body that will activate the service, the sending date or keywords in the sending date of the e-mail which will activate the service, and which level or priority will activate the service (for example, the subscriber may desire that only messages marked "urgent" should be forwarded by the NHSE service). It will be appreciated by those skilled in the art having read the above description that the subscriber may simply elect to have all e-mail messages forwarded under the present-inventive NHSE service, if desired.

After the audio e-mail message is played during a terminated telephone call, the system can give the subscriber the opportunity to input a code from a menu to have the message stored directly into voice mail for customers also having a voice mailbox maintained by the system. For example, the announcement after the audio e-mail message can state: "If you would like to save this e-mail message in your voice mailbox, please press '9'."

The system can also give the customer the opportunity to have the e-mail message repeated one or more times. This may allow customers who have integrated telephone/answering machines to record the next playing of the e-mail message.

5   The present inventive system and method briefly operate as follows. When the SCP detects an e-mail message intended for one of the NHSE subscribers, the SCP database is queried for handling instructions. The header information in the e-mail message is compared with the intended customer's NHSE list to determine whether a match exists. If a match exists, the SCP

10   determines whether the subscriber also has Caller ID service. If so, the SCP constructs Caller ID header information to send to the subscriber's telephone number. The Caller ID information can include an indication that an e-mail message is being sent, the sender's e-mail address, and the subject of the e-mail (which can be truncated if necessary).

15   When the e-mail is forwarded to the subscriber's telephone number, it is preceded by a distinctive ringing pattern, allowing a subscriber to either answer the telephone and hear the e-mail message, or ignore the call and have the message stored by an answering device or in voice mail. Along with the distinctive ringing pattern, the subscriber's telephone number also

receives Caller ID information identifying the e-mail sender's address and the e-mail subject.

If the subscriber has chosen a truncation option, the e-mail message is truncated according to the subscriber's truncation instructions.

The intelligent peripheral of the SSP serving the subscriber converts the text of the e-mail message into an audio message. After a call from the SCP to the subscriber is "terminated," the audio version of the e-mail message is played for the subscriber (or to default mechanisms such as an answering machine or voice mail) by the intelligent peripheral.

2.   NHSE Algorithm Description

The handling of an e-mail message by the present-inventive Notifying and Hearing Selected E-Mails (NHSE) service is detailed below, with reference to the flowchart of Figure 3.

At the beginning step (302) of the algorithm 300, the SCP receives an e-mail message from the Internet indicating an NHSE subscriber as the intended recipient. In Step 304, the SCP determines whether information in the e-mail header meets the forwarding requirements in the subscriber's NHSE list information. If not, the e-mail is discarded by the NHSE system (although the e-mail is still passed to the appropriate Internet Service Pro-

vider in the preferred embodiment) in Steps 306 and 322, with no further action.

If the e-mail message is to be forwarded to the customer, the SCP checks the truncation option, and truncates the e-mail message accordingly (Steps 308 and 310). The e-mail header information is deleted in Step 312. To begin the transfer of the e-mail message to the subscriber, the SCP sends an InitialCallAttempt operation to the SSP (Step 314). Included in the InitialCallAttempt are the Destination Routing Address (DestinationRoutingAddress), which is the telephone number designated by the subscriber for receiving NHSE e-mail messages, and the Alerting Pattern (AlertingPattern) in the form of a distinctive ringing pattern indicating that a telephone call contains an NHSE e-mail message. The SCP also sends a RequestReportBCSM operation to the SSP requesting an answer event report.

In response to the operations sent to it in Step 314, the SSP uses the Destination Routing Address to originate and route a telephone call to the subscriber (Step 316). In Step 318 the TCP determines whether the subscriber also has Caller ID service. If so, the TCP prepares a Caller ID information header including the e-mail sender's e-mail address as the originating telephone number, and the e-mail subject in place of the calling party's name (Step 320).

In Step 322 the subscriber's telephone rings with the distinctive ringing pattern for the NHSE service. When the telephone is answered in Step 324 (either by the subscriber, an answering machine, or voice mail, for example), the SSP sends an EventReportBCSM operation to the SCP (Step 326). Upon receiving this latter operation, the SCP sends ConnectToResource and PlayAnnouncement operations back to the SSP (Step 328). Along with these operations, the SCP also sends the e-mail message text. The ConnectToResource operation connects the subscriber's line to the intelligent peripheral. The PlayAnnouncement operation causes the IP to convert the text of the e-mail message into an audio message, and to playback the message to the subscriber (Step 330).

The NHSE algorithm 300 ends with Step 332. After the audio e-mail message is played, the call can continue to be processed as any other call.

Variations and modifications of the present invention are possible, given the above description. However, all variations and modifications which are obvious to those skilled in the art to which the present invention pertains are considered to be within the scope of the protection granted by this Letters Patent.

It is noted that nothing in the present invention is inconsistent with, nor need interfere with normal e-mail operation. That is, all e-mails sent over the Internet will also continue to be handled by Internet Service Providers (ISPs) and forwarded to a subscriber's computer or server as per usual, unless the subscriber dictates otherwise. Therefore, the present-inventive NHSE service is a supplement to typical e-mail service in its preferred use, although NHSE service may serve as a subscriber's primary means of e-mail receipt in alternative uses.

CLAIMS

What is claimed is:

1.   In a telecommunication system, a method of providing to a sub-
scriber, an audio message converted from an electronic text message, said
method comprising the steps of:

providing a plurality of telephonic devices for initiating and receiving
telephone calls;

providing an automated intelligent network (IN) for the automated
processing of telephone calls in said telecommunication system, said IN
comprising a service control point (SCP) comprising control logic and an
SCP database, and said IN comprising a plurality of switches coupled to
telephone devices;

via said switches, routing calls authorized by said SCP to a destination
number specified by a calling party;

via said IN and said SCP, receiving an electronic mail (e-mail) mes-
sage specifying a subscriber as the intended recipient of said e-mail mes-
sage;

terminating a telephone call generated by said IN to a telephone num-
ber specified by said subscriber in said SCP database;

converting text in said e-mail message to an audio message; and

transmitting during said telephone call, an outgoing message comprising said audio message.

2.   The telecommunication method in Claim 1, further comprising the steps of:

comparing header information in said e-mail message received by said SCP to e-mail handling instructions stored in said SCP database; and

routing said e-mail message to the telephone number specified by the intended subscriber when said handling instructions so indicate.

3.   The telecommunication method in Claim 2, wherein said handling instructions are customizable by subscribers.

4.   The telecommunication method in Claim 3, wherein the transmitted e-mail message is truncated according to truncation instructions specified by subscribers.

5.   The telecommunication method in Claim 1, further comprising the steps of:

determining whether said subscriber also subscribes to a Caller Identification (Caller ID) service; and

transmitting to the telephone number, Caller ID information comprising and indication that a telephone call received by the subscriber contains an e-mail message.

6.   The telecommunication method in Claim 5, wherein said Caller ID information further comprises the identity of the e-mail sending party.

7.   The telecommunication method in Claim 5, wherein said Caller ID information further comprises a subject matter identifier of the e-mail message.

8.   The telecommunication method in Claim 5, wherein said Caller ID information further comprises a portion of the text of said e-mail message.

9.   The telecommunication method in Claim 1, wherein said terminating step includes sending a distinctive ringing pattern corresponding the inclusion of an e-mail message in said telephone call.

10.   The telecommunication method in Claim 3, wherein said e-mail message is not transmitted to a subscriber unless header information in the e-mail message indicates that the message is urgent.

11.   The telecommunication method in Claim 1, further comprising the steps of:

prompting a subscriber to enter a code corresponding to instructing said telecommunication system to store said audio message in a voice mailbox; and

storing said audio message in a voice mailbox upon receiving said

code.

12.   The telecommunication method in Claim 1, further comprising

the steps of:

prompting a subscriber to enter a code corresponding to instructing

said telecommunication system to repeat the playing of said audio message;

and

repeating the playing of said audio message upon receiving said code.

13.   A telecommunication system adapted to provide to a subscriber,

an audio message converted from an electronic text message, said system

comprising:

a plurality of telephonic devices adapted to initiate and receive tele-

phone calls;

an automated intelligent network (IN) adapted to automatically proc-

ess telephone calls in said telecommunication system, said IN comprising a

service control point (SCP) comprising control logic and an SCP database,

and said IN comprising a plurality of switches coupled to telephone devices;

and

a text-to-audio converter adapted to convert text in an electronic mail

(e-mail) message to an audio message;

wherein said switches are adapted to route calls authorized by said SCP to a destination number specified by a calling party;

wherein said IN and SCP are adapted to receive an e-mail message specifying a subscriber as the intended recipient of said e-mail message; and

5   wherein said IN is adapted to generate and terminate a telephone call to a telephone number specified by said subscriber in said SCP database, and to cause to be transmitted during said telephone call, an outgoing message comprising said audio message.

14.   The telecommunication system in Claim 13, wherein said SCP

10   is further adapted to compare header information in said e-mail message received by said SCP to e-mail handling instructions stored in said SCP database, and route said e-mail message to the telephone number specified by the intended subscriber when said handling instructions so indicate.

15.   The telecommunication system in Claim 14, wherein said han-

15   dling instructions are customizable by subscribers.

16.   The telecommunication system in Claim 15, wherein the transmitted e-mail message is truncated according to truncation instructions specified by subscribers.

17.   The telecommunication system in Claim 13, wherein said SCP

20   is further adapted to determining whether said subscriber also subscribes to a

Caller Identification (Caller ID) service, and transmit to the telephone number, Caller ID information comprising and indication that a telephone call received by the subscriber contains an e-mail message.

18.   The telecommunication system in Claim 17, wherein said Caller ID information further comprises the identity of the e-mail sending party.

19.   The telecommunication system in Claim 17, wherein said Caller ID information further comprises a subject matter identifier of the e-mail message.

20.   The telecommunication system in Claim 17, wherein said Caller ID information further comprises a portion of the text of said e-mail message.

21.   The telecommunication system in Claim 13, wherein said SCP is further adapted to send a distinctive ringing pattern corresponding the inclusion of an e-mail message in said telephone call.

22.   The telecommunication system in Claim 15, wherein said SCP is adapted to withhold the transmission of said e-mail message to a subscriber unless header information in the e-mail message indicates that the message is urgent.

23.   The telecommunication system in Claim 13, further comprising

an intelligent peripheral adapted to prompt a subscriber to enter a code

corresponding to instructing said telecommunication system to store said

audio message in a voice mailbox; and

5   a voice mailbox adapted to store audio messages, including audio e-

mail messages upon receiving said code.

24.   The telecommunication system in Claim 13, further comprising

an intelligent peripheral adapted to prompt a subscriber to enter a code cor-

responding to instructing said telecommunication system to repeat the play-

10   ing of said audio message; and

a voice mailbox adapted to store audio messages, including audio e-

mail messages upon receiving said code.

25.   The telecommunication system in Claim 13, wherein said text-

to-audio converter and the function of transmitting said outgoing message

15   are subsumed by an intelligent peripheral integrated into a switch.

26.   The telecommunication system in Claim 13, wherein said text-

to-audio converter and the function of transmitting said outgoing message

are subsumed by a stand-alone intelligent peripheral.

27.   The telecommunication system in Claim 13, wherein said text-

20   to-audio converter and the function of transmitting said outgoing message

are subsumed by an intelligent peripheral integrated into a Service Node

(SN).

ABSTRACT

An intelligent-networked telecommunication system for audio playing of Electronic Mail ("E-Mail") messages uses the Service Control Point (SCP) of the Intelligent Network (IN) to route e-mail messages directed to subscribing customers to the customer's telephone number when the e-mail header matches the limitations stored in the subscribing customer's profile. The text of the e-mail message is converted to an audio message which can either be heard by the customer when a call is answered, or stored on an answering machine or in a voice mailbox. The present-inventive Notifying and Hearing Selective E-Mails (NHSE) system and method also includes features such as the subscribing customer being able to specify that audio e-mail messages will be truncated to a specified length, sending a special Caller ID message identifying the e-mail sender and subject of the message when the customer also has Caller ID service, and preceding the transmission of the audio e-mail message with a distinctive ringing pattern, to allow a subscribing customer the option of going "off-hook" to listen to the message, or allow the call to go directly to voice mail or an answering machine.

FIGURE 1

FIGURE 2

SCP E-mail Server receives e-mail for subscriber. — 302

300

306 — Stop — 332

SSP's IP plays announce. to subscriber with the message converted from text e-mail. — 328

E-mail is discarded. — 330

SCP: Does e-mail header info. meet subscriber's selective info.? — 304

N

SCP sends SSP ConnectToResource and PlayAnnouncement operations. — 326

SSP sends EventReportBCSM oper. to SCP. — 324

Phone answered (subscriber, voice mail, or ans. mach.). — 322

Y

Is truncation option set to X? — 308

N

Subscriber's telephone rings with a distinctive pattern. — 320

Y

Subscriber's TCP designates e-mail sender's address as caller's telephone no., and e-mail subject as caller's name.

SCP truncates e-mail contents to length of X bytes. — 310

Y — 318

N

TCP: Subscriber has Caller ID service? — 318

SCP deletes transparent e-mail header information. — 312

SCP sends SSP InitialCallAttempt and RequestReportBCMSEvent operations. — 314

SSP originates and routes a call to the subscriber. — 316
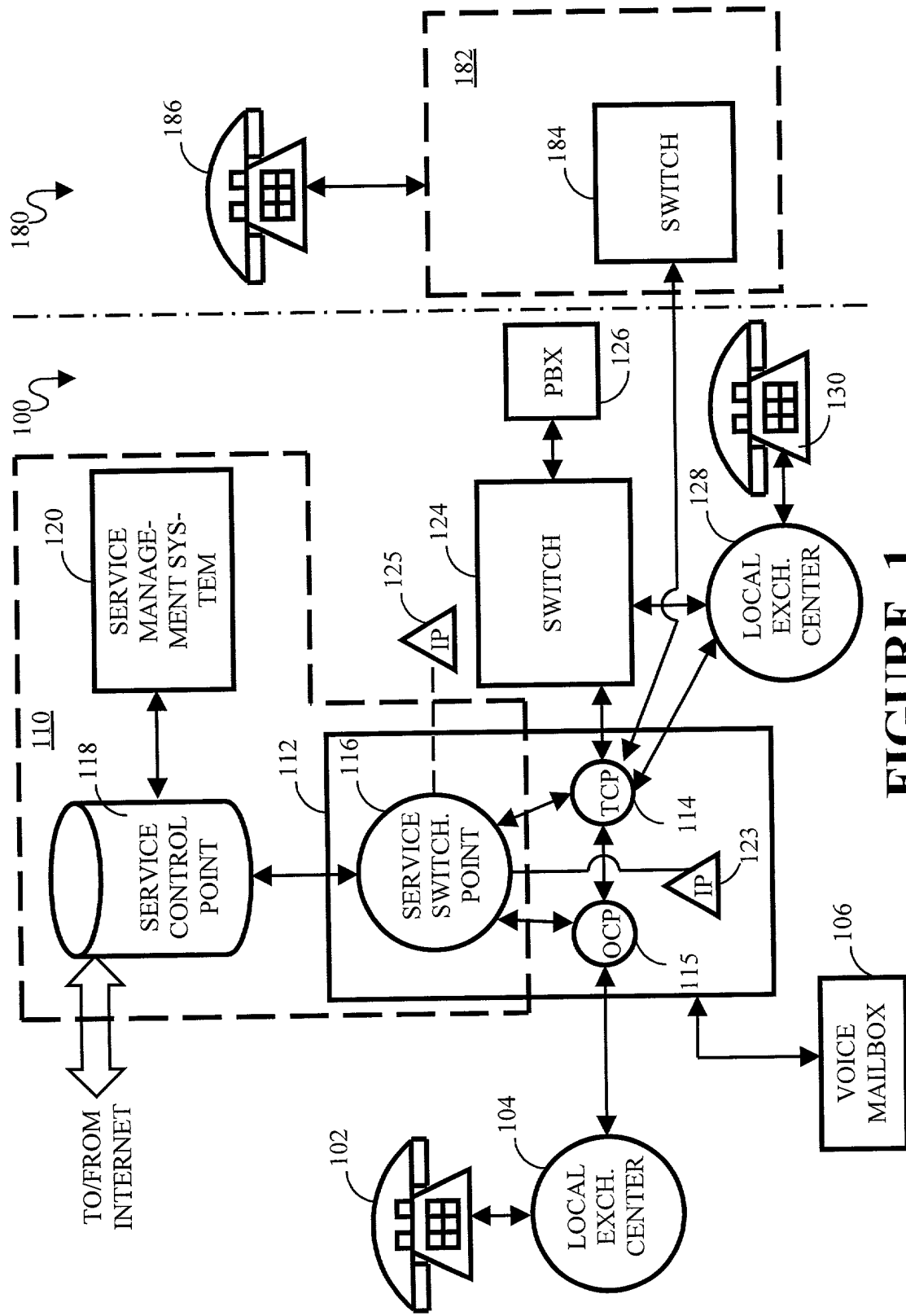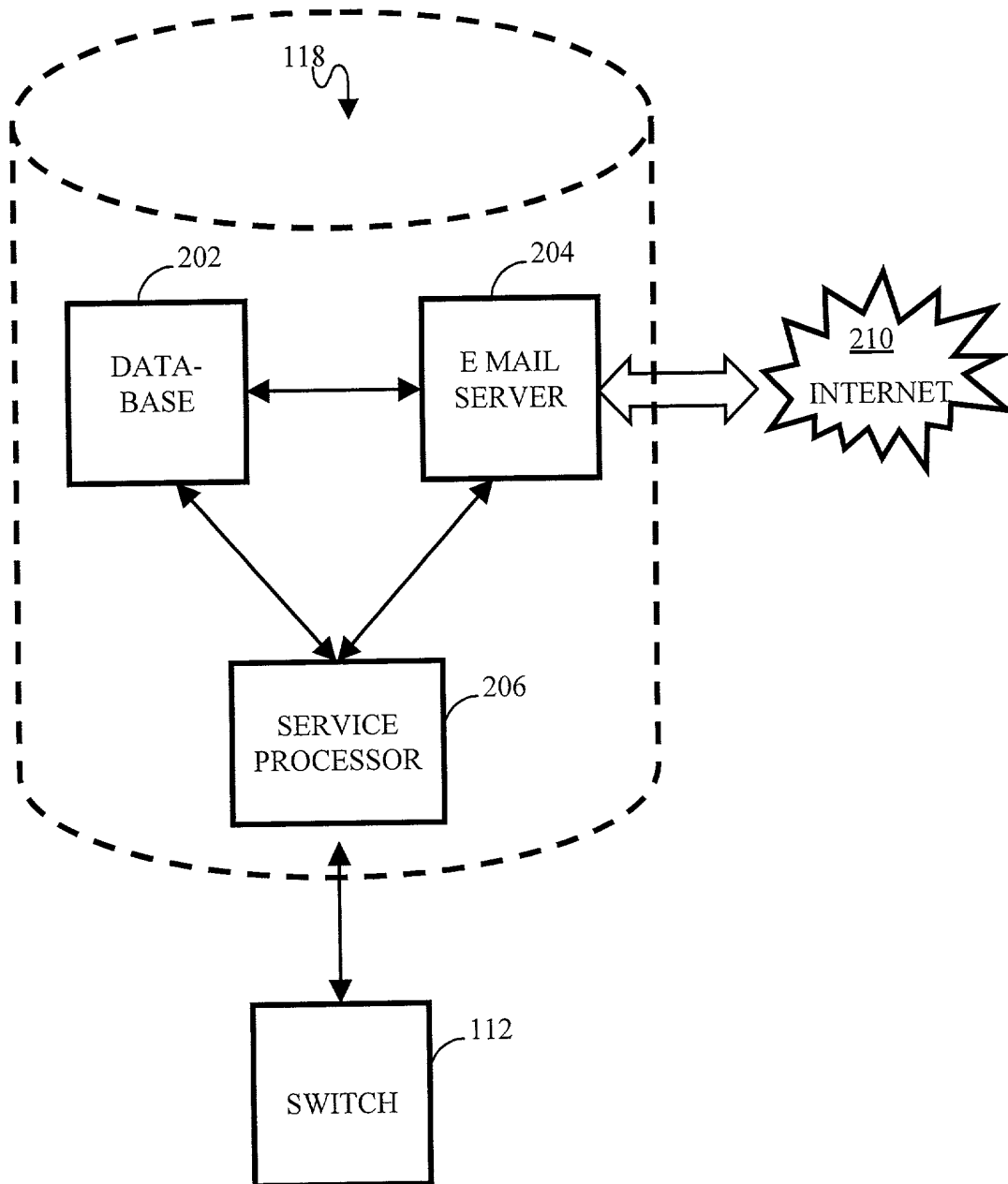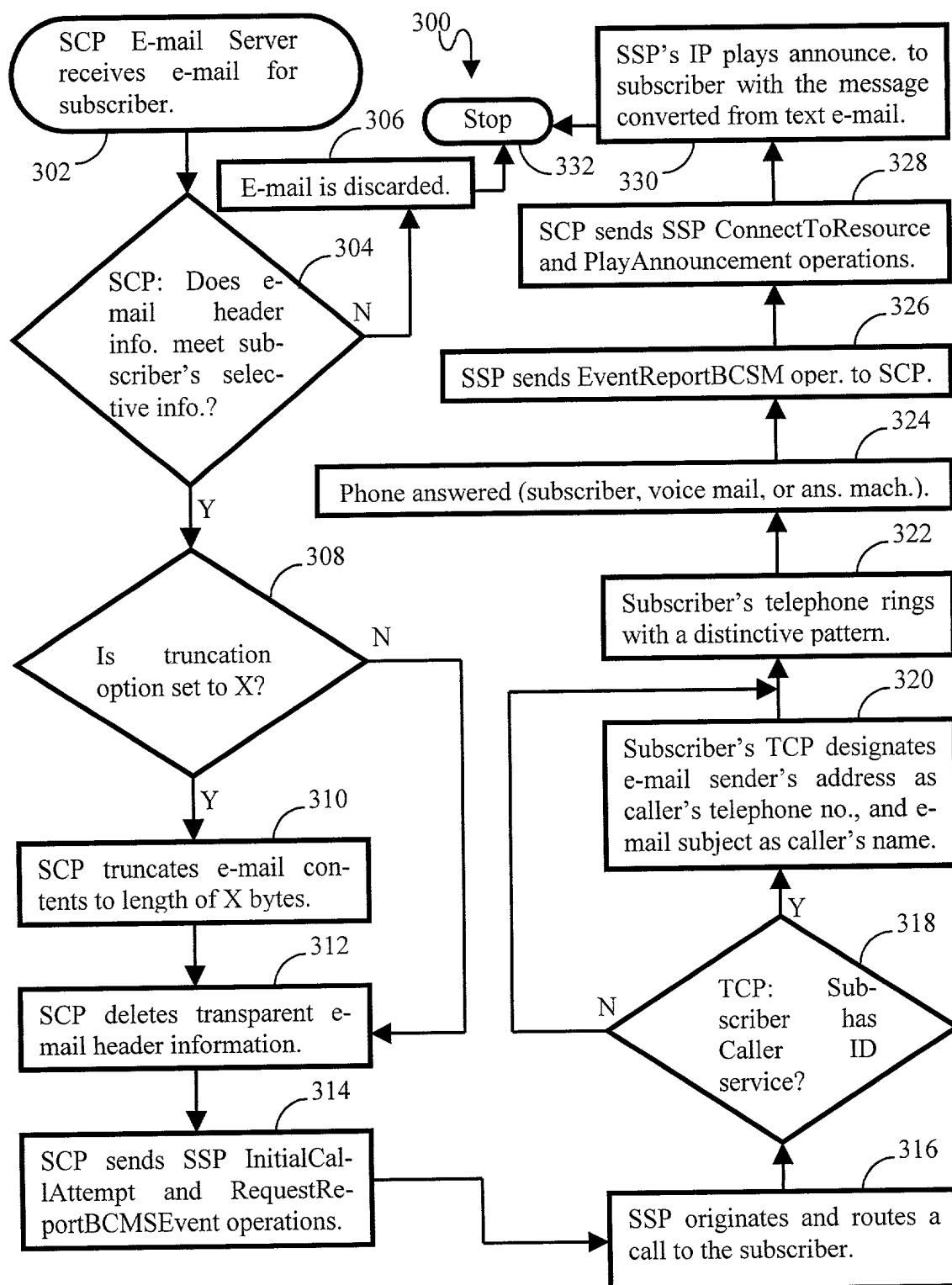
FIGURE 3

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Declaration and Power of Attorney

As the below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **INTELLIGENT-NETWORKED SYSTEM WITH SERVICE FOR NOTIFYING AND HEARING SELECTED E-MAILS VIA A PUBLIC SWITCHED TELEPHONE NETWORK**, the specification of which is attached hereto.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment, if any, specifically referred to in this oath or declaration.

I acknowledge the duty to disclose all information known to me which is material to patentability as defined in Title 37, Code of Federal Regulations, 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

None

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

None

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorney(s) with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected therewith:

Lester H. Birnbaum	(Reg. No. 25830)
Richard J. Botos	(Reg. No. 32016)
Jeffery J. Brosemer	(Reg. No. 36096)
Kenneth M. Brown	(Reg. No. 37590)
Craig J. Cox	(Reg. No. 39643)
Donald P. Dinella	(Reg. No. 39961)
Guy Eriksen	(Reg. No. 41736)
Martin I. Finston	(Reg. No. 31613)
James H. Fox	(Reg. No. 29379)
William S. Francos	(Reg. No. 38456)
Barry H. Freedman	(Reg. No. 26166)
Julio A. Garceran	(Reg. No. 37138)
Mony R. Ghose	(Reg. No. 38159)
Jimmy Goo	(Reg. No. 36528)
Anthony Grillo	(Reg. No. 36535)
Stephen M. Gurey	(Reg. No. 27336)
John M. Harman	(Reg. No. 38173)
Michael B. Johannesen	(Reg. No. 35557)
Mark A. Kurisko	(Reg. No. 38944)
Irena Lager	(Reg. No. 39260)
Christopher N. Malvone	(Reg. No. 34866)
Scott W. McLellan	(Reg. No. 30776)
Martin G. Meder	(Reg. No. 34674)
John C. Moran	(Reg. No. 30782)
Michael A. Morra	(Reg. No. 28975)
Gregory J. Murgia	(Reg. No. 41209)
Claude R. Narcisse	(Reg. No. 38979)
Joseph J. Opalach	(Reg. No. 36229)
Neil R. Ormos	(Reg. No. 35309)
Eugen E. Pacher	(Reg. No. 29964)
Jack R. Penrod	(Reg. No. 31864)
Daniel J. Piotrowski	(Reg. No. 42079)
Gregory C. Ranieri	(Reg. No. 29695)
Scott J. Rittman	(Reg. No. 39010)
Eugene J. Rosenthal	(Reg. No. 36658)
Bruce S. Schneider	(Reg. No. 27949)
Ronald D. Slusky	(Reg. No. 26585)
David L. Smith	(Reg. No. 30592)
Patricia A. Verlangieri	(Reg. No. 42201)
John P. Veschi	(Reg. No. 39058)
David Volejnicek	(Reg. No. 29355)
Charles L. Warren	(Reg. No. 27407)
Jeffrey M. Weinick	(Reg. No. 36304
Eli Weiss	(Reg. No. 17765)

I hereby appoint the attorney(s) on ATTACHMENT A as associate attorney(s) in the aforementioned application, with full power solely to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent and Trademark Office connected with the prosecution of said application. No other powers are granted to such associate attorney(s) and such associate attorney(s) are specifically denied any power of substitution or revocation.

Full name of 1st joint inventor: **Shiyan Hua**

Inventor's
signature _____ Date 2/29/00

Residence: U.S.A.

Citizenship: China

Post Office Address: 1077 Briarbrook Drive, #103
                            Wheaton, Illinois 60187
                            U.S.A.

Full name of 2nd joint inventor: **Yigang Cai**

Inventor's
signature _____ Date 2/29/00

Residence: U.S.A.

Citizenship: China

Post Office Address: 1919 Nutmeg Lane
                            Naperville, Illinois 60565
                            U.S.A.

Full name of 3rd joint inventor:

Inventor's
signature _____ Date _____

Residence:

Citizenship:

Post Office Address:

ATTACHMENT A

Attorney Name(s): <u>Gregory P. Gadson</u>   Reg. No.:   <u>31,254</u>

                                        <u>   </u>

                                          <u>   </u>

Telephone calls should be made to Gregory P. Gadson, Esq. at:

    Phone No.:   <u>(317) 773-9083</u>

    Fax No.:   <u>(317) 770-7595</u>

All written communications are to be addressed to:

<div align="center">

Gregory P. Gadson, Esq.

19375 Amber Way

Indianapolis, Indiana 46060

</div>